

What is claimed is:

*Part B1*

1. A heterodimeric fusion protein comprising a first and a second chimeric chain, said first chimeric chain comprising a portion of an Ig heavy chain linked by a peptide bond to a first subunit of a heterodimeric cytokine, said second chimeric chain comprising a portion of an Ig heavy chain linked by a peptide bond to a second subunit of said heterodimeric cytokine, said first and a second chain being linked by a disulfide bond.
2. A fusion protein comprising a first chimeric Ig chain comprising a portion of an Ig heavy chain linked by a peptide bond to a first subunit of a heterodimeric cytokine, said first subunit of said cytokine being linked to a second subunit of said cytokine.
3. The fusion protein of claim 2 further comprising a second chimeric Ig chain comprising a portion of an Ig heavy chain linked by a peptide bond to a first subunit of a heterodimeric cytokine, said first subunit of said cytokine being linked to a second subunit of said cytokine, said first and second chains being linked by a disulfide bond.
4. A trimeric fusion protein comprising a first and a second chimeric chain linked by a disulfide bond, said first chimeric chain comprising a portion of an Ig heavy chain linked by a peptide bond to a first subunit of a heterodimeric cytokine, said second chimeric chain comprising a portion of an Ig heavy chain linked by a peptide bond to a second subunit of said cytokine, said second subunit being linked by a disulfide bond to another said first subunit of said cytokine.
5. A fusion protein comprising a chimeric Ig chain comprising a portion of an Ig light chain linked by a peptide bond to a first subunit of a heterodimeric cytokine, said first subunit of said cytokine being linked to a second subunit of said cytokine.
6. The fusion protein of claim 1, 2, 3, 4 or 5 wherein said fusion protein displays cytokine biological activity.
7. The fusion protein of claim 1, 2, 3, 4 or 5 wherein said fusion protein displays antigen-binding specificity.

8. The fusion protein of claim 1, 2, 3, 4 or 5 wherein said fusion protein has a longer circulating half-life than an unlinked heterodimeric cytokine.

9. The fusion protein of claim 1, 2, 3 or 4 wherein said portion of an Ig heavy chain further comprises a CH1 domain.

10. The fusion protein of claim 9 wherein said portion of an Ig heavy chain further comprises a CH2 domain.

11. The fusion protein of claim 10 wherein said portion of an Ig heavy chain further comprises a CH3 domain.

12. The fusion protein of claim 1, 2, 3 or 4 wherein said portion of an Ig heavy chain further comprises a CH2 and a CH3 domain.

13. The fusion protein of claim 1, 2, 3, 4 or 5 wherein said heterodimeric cytokine is IL-12.

14. A heterodimeric fusion protein comprising a first and a second chimeric chain, said first chimeric chain comprising an antigen linked to a first subunit of a heterodimeric cytokine, said second chimeric chain comprising an antigen linked to a second subunit of said heterodimeric cytokine, said first and a second chain being linked by a disulfide bond.

15. A fusion protein comprising a first chimeric Ig chain comprising an antigen linked to a first subunit of a heterodimeric cytokine, said first subunit of said cytokine being linked to a second subunit of said cytokine.

16. The fusion protein of claim 15 further comprising a second chimeric Ig chain comprising an antigen linked to a first subunit of a heterodimeric cytokine, said first subunit of said cytokine being linked to a second subunit of said cytokine, said first and second chains being linked by a disulfide bond.

17. A trimeric fusion protein comprising a first and a second chimeric chain linked by a disulfide bond, said first chimeric chain comprising an antigen linked to a first subunit of

a heterodimeric cytokine, said second chimeric chain comprising an antigen linked to a second subunit of said cytokine, said second subunit being linked by a disulfide bond to another said first subunit of said cytokine.

18. A method of selectively targeting a heterodimeric cytokine, comprising the step of linking at least one subunit of said heterodimeric cytokine by a peptide bond to a portion of an Ig heavy chain, thereby to form a fusion protein displaying binding specificity for a predetermined antigen and cytokine biological activity.
19. A method of selectively targeting a heterodimeric cytokine, comprising the steps of:
  - (a) linking a first subunit of said heterodimeric cytokine by a peptide bond to a portion of a first Ig heavy chain, thereby forming a first chimeric chain;
  - (b) linking a second subunit of said heterodimeric cytokine by a peptide bond to a portion of a second Ig heavy chain, thereby forming a second chimeric chain; and
  - (c) linking said first and said second chimeric chain by a disulfide bond, thereby forming a heterodimeric fusion protein,  
said fusion protein displaying binding specificity for a predetermined antigen and cytokine biological activity.
20. A method of selectively targeting a heterodimeric cytokine, comprising the steps of:
  - (a) linking a first subunit of said heterodimeric cytokine by a peptide bond to a polypeptide, thereby forming a first chimeric chain, said first subunit of said cytokine being linked to a second subunit of said cytokine by a disulfide bond;
  - (b) linking a first subunit of said heterodimeric cytokine by a peptide bond to a polypeptide, thereby forming a second chimeric chain, said first subunit of said cytokine being linked to a second subunit of said cytokine by a disulfide bond;  
and

(c) linking said first and said second chimeric chain by a disulfide bond, thereby forming a heterodimeric fusion protein,  
said fusion protein displaying binding specificity for a predetermined antigen and cytokine biological activity.

21. A method of increasing the circulating half-life of a heterodimeric cytokine, comprising the step of linking at least one subunit of said heterodimeric cytokine to a polypeptide, thereby forming a fusion protein having a longer circulating half-life than an unlinked heterodimeric cytokine.

22. The method of claim 21 wherein said polypeptide is selected from the group consisting of a portion of an Ig heavy chain, a portion of an Ig light chain, an antigen, and serum albumin.

23. A method of increasing the circulating half-life a heterodimeric cytokine, comprising the steps of:

(a) linking a first subunit of said heterodimeric cytokine by a peptide bond to a polypeptide, thereby forming a first chimeric chain, said first subunit of said cytokine being linked to a second subunit of said cytokine by a disulfide bond;

(b) linking a first subunit of said heterodimeric cytokine by a peptide bond to a polypeptide, thereby forming a second chimeric chain, said first subunit of said cytokine being linked to a second subunit of said cytokine by a disulfide bond; and

(c) linking said first and said second chimeric chain by a disulfide bond, thereby forming a heterodimeric fusion protein,  
said fusion protein having a longer circulating half-life than unlinked first and second heterodimeric cytokines.

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24. The method of claim 23 wherein said first and second polypeptides are selected from the group consisting of a portion of an Ig heavy chain, a portion of an Ig light chain, an antigen, and serum albumin.